continue to be actively considered and searched for in LVAD populations. The article by Hrytsyna and colleagues² importantly identifies the value of an active, standardized approach to assessing all LVAD patients and enables recovery to remain at the forefront of the minds of providers, so our eyes can see it.

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Commentary: Myocardial recovery: A good thing but challenging

Hidefumi Nishida, MD, and Takeyoshi Ota, MD, PhD

We congratulate Hrytsyna and colleagues¹ on the original article regarding their clinical experience with a standardized protocol for left ventricular assist device (LVAD) explantation. The protocol uses step-by-step criteria in a rigorous fashion to select candidates for LVAD explantation. The clinical outcomes after LVAD explantation using the standardized protocol were excellent with minimal adverse events.

It is well known that a certain patient population on LVAD support with optimal medical therapy could achieve myocardial recovery.²⁻⁴ As the authors mentioned in their article, a number of retrospective studies reported that predictors of successful LVAD explantation included younger age, being female, shorter duration of heart

Hidefumi Nishida, MD (left), and Takeyoshi Ota, MD, PhD (right)

CENTRAL MESSAGE

The standardized protocol for LVAD explantation has been established through the diligence and efforts of the authors. We hope it is a breakthrough in this field.

failure, or nonischemic cardiomyopathy.^{3,4} However, it is difficult to assess a patient with an LVAD with being under LVAD support if the patient on an LVAD could tolerate a LVAD explantation and could maintain in a good hemodynamic status long term. Thus, there has not been a consensus or guideline to select candidates for LVAD explantation. Birks and colleagues⁵ reported 11 of 15 patients (73.3%) with nonischemic cardiomyopathy who achieved LVAD explantation using their own criteria. Their criteria were a combination of physical performance (6-minute walking test) and hemodynamic parameters with the LVAD being stopped (ie, left ventricular end-diastolic diameter <60 mm, left ventricular end-systolic diameter

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of <50 mm, left ventricular ejection fraction was $\geq 45\%$, left ventricular end-diastolic pressure ≤ 12 mm Hg, cardiac index >2.8). While their clinical outcomes were acceptable, they preselected candidates (ie, nonischemic cardiomyopathy), and it may not be applicable for all patients with an LVAD. The standardized protocol by Hrytsyna and colleagues¹ offers a universal use and allows screening candidates of LVAD explantation based on objective data.

One of the reasons that a consensus in this field has not been established is the lack of prospective randomized studies, which are impossible to conduct due to the nature of this specific medical condition. Another aspect contributing to the “delay” is that health care providers are hesitant about LVAD explantation because they do not have many options if those patients go back into decompensated heart failure, knowing redo LVAD insertions after LVAD explantation are challenging with a high expected surgical mortality. Therefore, the case volume of LVAD explantation has not been high in general. Goldstein and colleagues⁶ reported 1.8% (20/1108) patients achieved left ventricular recovery and subsequent explantation. Using multicenter data from the Interagency Registry for Mechanically Assisted Circulatory Support, Topkara and colleagues⁴ showed the rates of LVAD explantation for myocardial recovery were 0.9% at 1 year, 1.9% at 2 years, and 3.1% at 3 years. Regarding clinical outcomes after LVAD explantation, it was reported that the perioperative mortality rate was 9.2%, and 1-, 5-, and 10-year survival after explantation was 91%, 76%, and 65.7%, respectively. In addition, it is important to note that 9.4% patients required LVAD reimplantation.⁷

Instead of surgical LVAD explantation, recently percutaneous LVAD decommission has been applied in several institutions as a minimally invasive approach. We have experienced some successful percutaneous LVAD decommissions for myocardial recovery using a vascular plug (Amplatzer, St Jude Medical, Inc, St Paul, Minn) to occlude

the outflow graft without any surgical incisions and the use of cardiopulmonary bypass.⁸ This percutaneous approach for LVAD decommission might be an alternative option instead of surgical LVAD explantation and could reduce perioperative complications and surgical mortality while long-term follow-up would be warranted.

LVAD therapy has emerged as an important strategy to treat refractory heart failure for the last decade, leaving a lot of challenges and clinical questions. The efforts of investigators have contributed to the current development of LVAD therapy and management. We hope the study by Hrytsyna and colleagues will be a breakthrough and landmark in this field.

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